

Amendments to the Claims:

This listing of claims will replace all prior versions and listings, of claims in the application:

Listing of Claims:

- 1 **(Original)** A bioabsorbable plug implant, suitable for bone tissue regeneration, comprising a first portion, and a second portion extending outwardly from the first portion, the first and second portions formed from expandable material, and wherein the expandable material is a porous material.
2. **(Currently Amended)** The plug implant ~~of~~according to claim 1, wherein the plug implant has a completely interconnected porous architecture.
3. **(Currently Amended)** The plug implant ~~of the~~according to claim 1-claims 1 to 2, wherein the plug implant is shaped like at least one of a cone, truncated-cone, a pentahedron, a truncated-pentahedron, ~~and/or and~~ a button mushroom.
4. **(Currently Amended)** The plug implant ~~of~~according to claim 1-claims 1 to 3, wherein the first portion comprises a first surface, and the second portion comprises a second surface, opposite to the first, the first surface having an area smaller than the area of the second surface.
5. **(Currently Amended)** The plug implant ~~of~~according to claim 1-claims 1 to 4, wherein the first and second surface are plane surfaces.
- 6-7. **(Canceled)**
8. **(Currently Amended)** The plug implant ~~of~~according to claim 1 claims 1 to 7, wherein the first portion has a thickness X, and the second portion has a thickness Y, the ratio X:Y being from 1:1 to 10:1.

9. **(Currently Amended)** The plug implant ~~ef~~according to claim 1 ~~claims 1 to 8~~, wherein the expandable material comprises bioresorbable polycaprolactone (PLC).

10. **(Currently Amended)** The plug implant ~~ef~~according to claim 9, wherein the expandable material is prepared by layering PLC filaments layer by layer.

11-12. **(Canceled)**

13. **(Currently Amended)** The plug implant ~~ef~~according to claim 1 ~~claims 1-12~~, wherein the ~~wherein the~~ expandable material comprises bioresorbable tricalcium phosphate-polycaprolactone (TCP-PLC).

14-18. **(Canceled)**

19. **(Currently Amended)** The plug implant ~~ef~~according to claim 1 ~~claims 1-18~~, further comprising a bioactive agent.

20. **(Currently Amended)** The plug implant ~~ef~~according to claim 1 ~~claims 1-19~~, further comprising cells seeded on the bioabsorbable scaffold of the plug implant.

21-22. **(Canceled)**

23. **(Original)** A bioabsorbable plug implant, suitable for bone tissue regeneration, formed from expandable material, wherein the expandable material is prepared by layering polycaprolactone (PLC) filaments layer by layer.

24. **(Currently Amended)** The bioabsorbable plug implant ~~ef~~according to claim 23, comprising a first portion, and a second portion extending outwardly from the first portion, the first and second portions formed from expandable material.

25. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 24~~, wherein the plug implant is shaped like at least one of a cone, truncated-cone, a pentahedron, a truncated-pentahedron, and/or and a button mushroom.

26. **(Currently Amended)** The plug implant ~~ef~~according to claim 24 ~~claims 24 to 25~~, wherein the first portion comprises a first surface, and the second portion comprises a second surface, opposite to the first, the first surface having an area smaller than the area of the second surface.
27. **(Currently Amended)** The plug implant ~~ef~~according to claim 24 ~~claims 24 to 26~~, wherein the first and second surface are plane surfaces.
28. **(Currently Amended)** The plug implant ~~ef~~according to claim 24 ~~claims 24 to 27~~, wherein the first and the second surfaces have circular, square or rectangular shapes.
29. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 28~~, wherein the plug implant has a tapered shape.
30. **(Currently Amended)** The plug implant ~~ef~~according to claim 24 ~~claims 24 to 29~~, wherein the first portion has a thickness X, and the second portion has a thickness Y, the ratio X:Y being from 1:1 to 10:1.
31. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 30~~, wherein the expandable material is a porous material.
32. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 31~~, wherein the plug implant has a completely interconnected porous architecture.
33. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 32~~, wherein the expandable material is prepared by layering PLC filaments layer by layer by using the Fused Deposition Modeling (FDM) technology.
34. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 33~~, wherein the PLC filament layers have an orientation of at least one of 0 degree, 60 degree and/or and 120 degree.

35. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 34~~, wherein the ~~wherein the~~ expandable material comprises bioresorbable tricalcium phosphate-polycaprolactone (TCP-PLC).

36. **(Currently Amended)** The plug implant ~~ef~~according to claim 35, wherein the TCP-PLC is TCP-PLC 20:80%.

37. **(Currently Amended)** The plug implant ~~ef~~according to claim 35 ~~claims 35 to 36~~, wherein the TCP-PLC has 60-70% of porosity.

38. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 37~~, wherein the plug implant comprises an opening for placement and removal of a catheter.

39. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 38~~, wherein the plug implant expands at contact with hydrophilic solution, hydrophilic liquid and/or body fluid.

40. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 39~~, wherein the plug implant is suitable to be inserted into a defect of a bone and the plug implant does not require means for fixing the plug to the external surface of the bone.

41. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 40~~, further comprising a bioactive agent.

42. **(Currently Amended)** The plug implant ~~ef~~according to claim 23 ~~claims 23 to 44~~, further comprising cells seeded on the bioabsorbable scaffold of the plug implant.

43. **(Currently Amended)** The plug implant ~~ef~~according to claim 42, wherein the cells are stem cells.

44. **(Currently Amended)** The plug implant ~~ef~~according to claim 42 ~~claims 42 to 43~~, wherein the cells are mesenchymal stem cells.

45-70. **(Canceled)**

71. **(Currently Amended)** A method for bone tissue regeneration comprising the steps of:

providing a bioabsorbable plug implant according to ~~any one of claims 23 to 44~~
claim 23;

inserting a first portion of the plug implant into a defect or gap of a bone, a second portion of the plug implant engaging the outside contour of the defect or gap; and

allowing the plug implant to contact body fluids, thereby expanding the size of the plug implant so that the plug fits into the defect or gap.

72. **(Currently Amended)** The method ~~of~~according to claim 71, wherein the plug implant is formed from a porous material allowing the bone cells to penetrate into the plug implant and to regenerate the bone tissue.

73. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 72,~~
~~which is a~~wherein the method is for performing cranioplasty.

74. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 73,~~
wherein plug implant and the bone defect or gap have an initial tolerance of less than 1 mm.

75. **(Currently Amended)** The method ~~of~~according to claim 74, wherein the initial tolerance is less than 0.5 mm.

76. **(Currently Amended)** The method ~~of~~according to claim 74, wherein the initial tolerance is less than 0.2 mm.

77. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 76~~, further comprising placing a catheter into an opening of the plug implant for performing drainage.

78. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 77~~, wherein the insertion of the plug implant into the bone defect does not require means for fixing the plug to the external surface of the bone surrounding the defect.

79. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 78~~, wherein the method is a non-therapeutic method for the cosmetic restoration of undesirable osseous gaps.

80. **(Currently Amended)** The method ~~of~~according to claim 71 ~~claims 71 to 79~~, wherein the plug implant further comprises seeding cells on the bioabsorbable scaffold of the plug implant.

81. **(Currently Amended)** The method ~~of~~according to claim 80, wherein the cells are stem cells.

82. **(Currently Amended)** The method ~~of~~according to claim 80 ~~claims 80 to 81~~, wherein the cells are mesenchymal stem cells.

83. **(Currently Amended)** A kit comprising the plug implant ~~of~~according to claim 23 ~~claims 1 to 44~~.